Sustain.Ability.

Don Morrison, John Escarcega
Enhancing and Sustaining APC Benefits
Agenda

• APC Benefits
• Industry Challenges
• Meeting the Challenges
• How Can Honeywell Help?
• Case Studies
• Wrap-up
Tangible APC Benefits

Advanced Control and Optimization benefits are field proven and generate high rates of return on investment.

Typical Benefits:
- Increased Throughput
- Improved Yields
- Decreased Operating Costs
- Improved Quality Consistency
- Increased Operating Flexibility
- Improved Process Stability

Typical Payback:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Payback Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and Gas</td>
<td>0 to 2 months</td>
</tr>
<tr>
<td>Refining</td>
<td>3 to 6 months</td>
</tr>
<tr>
<td>Chemicals</td>
<td>3 to 6 months</td>
</tr>
<tr>
<td>Petrochem</td>
<td>4 to 6 months</td>
</tr>
<tr>
<td>MMM</td>
<td>5 to 6 months</td>
</tr>
<tr>
<td>Pulping/Paper</td>
<td>6 to 8 months</td>
</tr>
<tr>
<td>Industrial Power</td>
<td>10 to 12 months</td>
</tr>
</tbody>
</table>
Intangible benefits are harder to quantify but can be quite significant depending on the project under evaluation.

- **Improved Process Safety**
  - Process Watchdog
  - Earlier Identification of Problems

- **Improved Operator Effectiveness**
  - Focuses on key operating parameters

- **Reduced Downstream Unit Variability**
  - Fewer Process Upsets

- **Better Process Information**
  - Increased Process Understanding
Why aren’t these benefits sustained?

• Attractive investment with good initial benefits

• Potential for rapid degradation of benefits without proper monitoring/maintenance

• Combination of tools and work process needed to sustain benefits

“…applications which are designed to make money can quickly degrade over a period of 18 months to yield nominal benefits (<25%) if they are not properly monitored and maintained from the time of installation.”

Honeywell APC Customer, Profit Suite Strategic User Forum
Agenda

- APC Benefits
- Industry Challenges
- Meeting the Challenges
- How Can Honeywell Help?
- Case Studies
- Wrap-up
Current Challenges

• Scarce Capital

• “Qualified” Resource Pool

• Sustaining Application Acceptance and Benefits

• Leveraging APC investments – Beyond the traditional benefit areas
Agenda

• APC Benefits
• Industry Challenges
• Meeting the Challenges
• How Can Honeywell Help?
• Case Studies
• Wrap-up
Meeting the Challenges

- Cost Effective Deployment and Sustainment
- Making the Operator More Effective
- Renewed focus on support infrastructure
- Integration of Applications
- Leveraging Enabling Technology
- Multi Unit / Plant Wide Optimization
- Streamlining Work Flow
Cost Effective Deployment / Sustainment

- Tools for
  - Reducing overall plant test time
  - Closed-loop Automated Step Testing
  - Model quality, diagnostics

- Leverage estimated matrices from simulations

- Faster deployment because of a quicker ‘diagnose/analyze-identify-update’ work flow during commissioning
Making the Operator More Effective

- **Analytical Tools and Decision Support Capabilities**
  - What-if scenario support
  - Easier problem identification and faster diagnostics

- **Visualization**
  - Presentation of information
  - Integration / Access to “non-APC” information

**Operational Excellence - Empowering the Operator**
Integration of Applications – Simulation

• **Steady state simulation**
  – Off-line simulation of control schemes
  – Leverage models on-line for control and optimization

• **Dynamic Simulation**
  – Re-use investment in the virtual plant
    • Design→Deploy→Maintain
  – Advanced integration features for testing

• **Reduce implementation time**
  – Testing control schemes
  – Initial controller models

• **Improve APC Uptime**
  – Operator training – improve acceptance
  – Performance validation / troubleshooting

*Common tools drive improved efficiency and long-term sustainability*
Leveraging Enabling Technology

Virtualization
- Reduce hardware footprint and maintenance costs
- Needs to be supported by DCS for on-process use

Remote Collaboration
- Cost effective sustainment
- Knowledge Management within an organization
Multi Unit / Plant-Wide Optimization

- **Beyond single unit optimization** to maximize business results

- **Global optimization** of constrained and unconstrained systems

- **Dynamic optimization** can deliver significant sustained benefits, especially when integrated with APC

![Diagram](image)
Unified Technology Platform

Continuum of Control Solutions

- Technology based on a common workflow
- Control to user specified constraints (limits)
- Optimize operations (economics)
- Standard infrastructure and common features
- Extensible and customizable

Flexible, scalable solution to cover a wide range of applications
Streamlining Workflow

Automate tasks where sensible

Result:
- Improve Overall Sustainability
- Enable Remote Serviceability
- Enable Remote Collaboration
Agenda

- APC Benefits
- Industry Challenges
- Meeting the Challenges
- How Can Honeywell Help?
- Case Studies
- Wrap-up
How can Honeywell help?

• Experienced personnel
• Familiar with the right technology
• Deliver the necessary services
• Ensure long-term sustained benefits
Honeywell is the Market Leader in APC and RTO*

150+ Higher Level Optimization Applications
3200+ Multivariable Controller Applications
1000+ Major Unit Implementations (MPC-Based Optimization)
550+ Industrial Sites
300+ Customers Worldwide

Estimated $5 Billion in Benefits since 1996

Profit Suite Services & Support

• Development/Product Management
  – 50+ developers world-wide

• Project Services
  – 150+ representatives globally

• Advanced Application Aftermarket and Support Services
  – 60+ dedicated AppTech personnel

• Depth of education, experience and knowledge in technology and domain expertise spread across all functions

Worldwide Service and Support Capabilities

"Local expertise, globally networked"

(3rd Party implementation where appropriate)
<table>
<thead>
<tr>
<th>Honeywell APC Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refining Processes</td>
</tr>
<tr>
<td>Alkylation</td>
</tr>
<tr>
<td>Catalytic Cracking</td>
</tr>
<tr>
<td>Coking</td>
</tr>
<tr>
<td>Crude Distillation</td>
</tr>
<tr>
<td>Hydrocracking</td>
</tr>
<tr>
<td>Hydrotreating</td>
</tr>
<tr>
<td>Isomerization</td>
</tr>
<tr>
<td>Lubes</td>
</tr>
<tr>
<td>Reforming</td>
</tr>
<tr>
<td>Petrochemical</td>
</tr>
<tr>
<td>Aromatics</td>
</tr>
<tr>
<td>Butadiene</td>
</tr>
<tr>
<td>Ethylene</td>
</tr>
<tr>
<td>VCM</td>
</tr>
<tr>
<td>PTA</td>
</tr>
<tr>
<td>Industrial Utilities</td>
</tr>
<tr>
<td>Co-Generation</td>
</tr>
<tr>
<td>Power/Steam</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pulp &amp; Paper</td>
</tr>
<tr>
<td>MD Control</td>
</tr>
<tr>
<td>Bleaching</td>
</tr>
<tr>
<td>Lime Kiln</td>
</tr>
<tr>
<td>ClO2 Generation</td>
</tr>
<tr>
<td>O2 Delignification</td>
</tr>
<tr>
<td>Kamyr Digester (R&amp;D)</td>
</tr>
<tr>
<td>Thermo-Mechanical Pulping (TMP)</td>
</tr>
<tr>
<td>Polymers</td>
</tr>
<tr>
<td>Nylon</td>
</tr>
<tr>
<td>Polyethylene</td>
</tr>
<tr>
<td>Polypropylene</td>
</tr>
<tr>
<td>Polystyrene</td>
</tr>
<tr>
<td>Chemicals</td>
</tr>
<tr>
<td>Acetic Anhydride</td>
</tr>
<tr>
<td>Methanol</td>
</tr>
<tr>
<td>Ammonia</td>
</tr>
<tr>
<td>Semiconductor</td>
</tr>
<tr>
<td>Discrete Manufacturing Control</td>
</tr>
<tr>
<td>Mining &amp; Minerals</td>
</tr>
<tr>
<td>Grinding Mill Control</td>
</tr>
<tr>
<td>Ball Mill Control</td>
</tr>
<tr>
<td>Digestion</td>
</tr>
<tr>
<td>Precipitation</td>
</tr>
<tr>
<td>Evaporation</td>
</tr>
<tr>
<td>Bayer Circuit</td>
</tr>
<tr>
<td>Heat Interchange</td>
</tr>
<tr>
<td>Bauxite</td>
</tr>
<tr>
<td>Clarification</td>
</tr>
<tr>
<td>Mills</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
</tr>
<tr>
<td>NGL Plants</td>
</tr>
<tr>
<td>LNG Plants</td>
</tr>
<tr>
<td>Off-Shore Production</td>
</tr>
</tbody>
</table>
Profit Suite® for Control & Optimization

Advanced Control and Optimization Layers

Business Integration

Integrated & Scalable Optimization Solutions

Non-Linear Control & Plant Optimization
Profit Optimizer, Profit Bridge
UniSim Optimization

Model Predictive Control & Unit Optimization
Profit Controller
Profit Controller Express

Soft Sensor Technology
Profit SensorPro
UOP Toolkits

Advanced Regulatory Control
Profit Loop, TaiJi PID

Control Performance Monitor / Profit Expert
Embedded History Performance Reports
Performance Monitoring & Diagnostics

Process Solutions Systems, Services & Services
Delivering Value as a Cohesive Solution

- Profit Controller
- TaiJi PID Profit Stepper
- UniSim Lifecycle Simulation Tools
- Control Performance Monitor

Real-time, Dynamic Optimization

Optimum Operation

Profits

Current Operation

Additional $ Benefits

Wait for Steady State

Optimum

Steady-State Optimization

Time
Profit Suite R410 – Major Release

**Increase Engineering Efficiency**
- Simplify Migration
- New Engineering Environment
- Automate key tasks

**Increase Process Performance**
- Novel MVC for Power, OAG
- Enhanced Operator Interface

**Sustain**
- Simplified Maintenance
- Integrate Matrikon and HPS Technologies
- Collaborative Remote Services Programs

Simplified Migration and Improved Maintenance Tools Sustain Investment
Design for Migration/Maintainability

• Deliver high-value functionality faster
  – Functional enhancements delivered as incremental release*
  – Cumulative over release cycle

• Reduce Migration Effort/Risk
  – Final update provides all new release functionality
  – No uninstall/reinstall
Advanced Application Project Services

Consulting
Feasibility Studies
Master Plans
Benefits Audits

Project Implementation
Design
Implementation
Commissioning
Start-up

More than 3,500 Man-Years Process Industry Experience

Training Programs
• Operator Training
• Process Simulation

SAFE Programs
• Outsourced Automation
• Technology Refresh
Optimal Performance Services

Application Upgrade Services
On-site Features Training
On-site Services Migration

Sustained Benefits Programs
Remote Monitoring
Onsite Services
Site Resident Engineering
Application Services Agreements
(combined licensing and services)

Expanded Training Offerings
Profit Controller Maintenance Course
Advanced Profit Controller Implementation
Profit SensorPro
Agenda

• APC Benefits
• Industry Challenges
• Meeting the Challenges
• How Can Honeywell Help?
• Case Studies
• Wrap-up
Case Studies

• Saudi Aramco: “Finding the Needle in the Haystack”
  – *Effective use of Technology and Work Processes*

• Kairos: “A Partnership Model for Life Cycle Support”
  – *Remote Collaboration*
Saudi Aramco – Process Optimization

Saudi Aramco, Saudi Arabia:

- Issues with base level regulatory control availability (>50% of loops in non-normal mode) at various facilities
  - 5 refineries
  - 8 gas plants
- Impact on performance of existing APC applications (over 130)
- No standard processes for monitoring and maintaining critical assets
- No processes to prioritize maintenance

Solution Applied

- Standard, consistent program to monitor APC as ‘assets’ across facilities
- CPM dashboard to allow for wide access to results

Key Benefits

- Significant increase in loops in ‘normal’ mode
- Significant increase in APC service factors
- Measurable increase in economic performance of key automation assets (PID, APC) across enterprise
Kairos – Partnership Model for Life Cycle Support

Mission Statement
To deliver integration, installation and startup services, plus the lifecycle support of the automation and control systems that ensure satisfactory results to the clients.

Foundation date
December 12th, 2006

Business Area
Automation processes for mining industry
Remote Collaboration – Monitoring and Support

- Real time access to Concentrator Plants Automation systems
- Technical Support 7 x 24
- Continuous monitoring of the Advanced Control infrastructure
- Integrated vision of Processes and KPI’s
- Lifecycle support for Advanced Control applications
- Platform for development of Operators and Process Knowledge
Agenda

- APC Benefits
- Industry Challenges
- Meeting the Challenges
- How Can Honeywell Help?
- Case Studies
- Wrap-up
Wrap-up

• APC benefits are clear, but are often not sustained

• A workflow that integrates all aspects of the APC lifecycle is necessary to sustain APC benefits

• Honeywell has the personnel, experience and technology to help you sustain and improve APC benefits
Continue the Conversation Online

Twitter
@hwusers
#HUG12

Website
HUG Live

Flickr
LinkedIn
Facebook
YouTube

Honeywell Users Group